

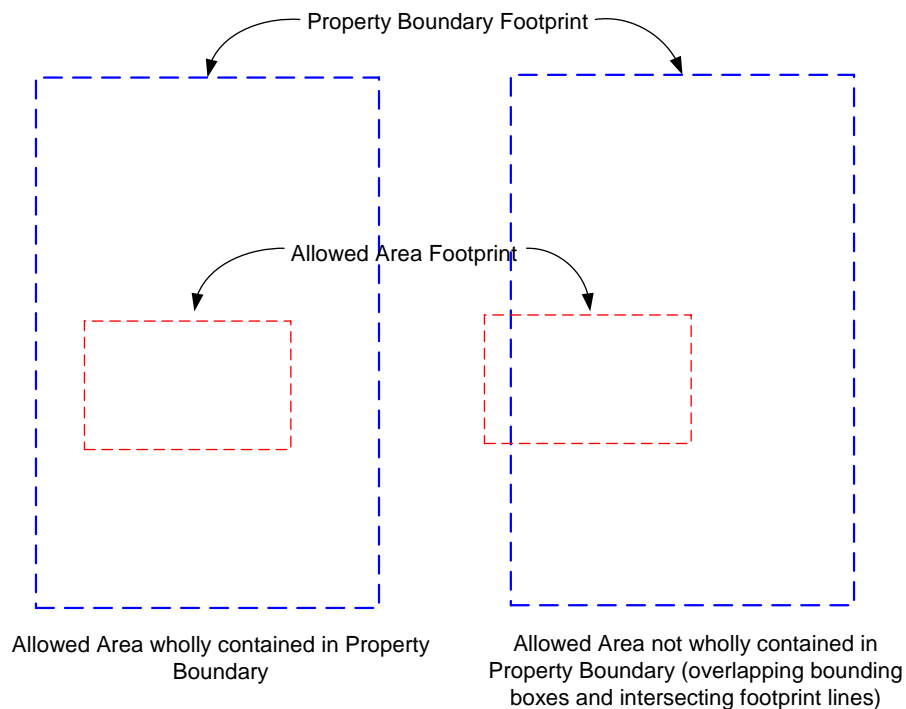
Flow of Events for Use Case – Define Allowed Area

Change Log	
29/09/2004	Created This use case replaces the previous use cases 'Define Allowed Area', and 'Locate Allowed Area'.
31/10/2004	Finalized for pre-integrated model

Overview

This use case is based on the concept that whilst a given property or external space may be assigned to a given owner (or lessee or tenant) or may be designated to fulfil a particular environmental, recreational or social role, planning requirements only allow for construction to occur within a designated area and this must be equal to or larger than the projected area of the construction onto the ground¹.

It defines the boundary limits of an area within a physical property or other external space within which construction is allowed and provides a test to ensure that an allowed is actually located within the boundary area determined for the containing physical property.



¹ Assumed that the allowed area must contain the projected area of the building including overhang. See issue list for question as to whether this is the case or whether the building footprint can be used.

Process

Preconditions

A property or properties exist and are identified or an external space exists and is defined

A boundary exists for the identified property/properties or external space.

Where the allowed area is to be tested for location against a boundary, the allowed area(s) must be defined and related to the property or external space.

Actors

Applicant OR Authority

Main Flow

1. If allowed area is to be defined then <S1>
2. If the allowed area is to be located and tested against the boundary position then <S2>

Subflows

S1: Define Allowed Area

Flow	Entity
1. Select the property or external space within which the allowed area is to be located.	IfcSpace
2. Place the extents of the allowed area using the use case 'Place 2D Spatial Shape'	IfcShapeRepresentation
3. The representation identifier is set to 'Allowed Area Boundary'.	IfcShapeRepresentation
4. Create an instance of IfcSpace to designate the area and ensure attribute values are set appropriately to an external space.	IfcSpace
5. Assert a containment relationship between the physical property/external space and the allowed area using IfcRelAggregates (similar to the spatial hierarchy used in buildings). Note that this containment relationship allows for the fact that a physical property/external space may contain more than one allowed area (and thus more than one construction that is subject to planning requirements).	IfcRelAggregates
6. Determine the purpose of the allowed area on this property.	
7. Assert the purpose of the allowed area through a property within the relevant property set. Note the restrictions that may be placed on the purpose of an allowed area contained within a special area.	Pset_AllowedArea

S2: Locate Allowed Area

Flow	Entity
1. Determine the allowed area that is to be tested.	IfcSpace
2. Get the footprint shape representation of the allowed area and retrieve the coordinates that define its shape.	IfcShapeRepresentation
3. Traverse the relationship between the allowed area and physical property (IfcRelAggregates) to determine the property within which the allowed area is to be contained.	IfcRelAggregates
4. Get the footprint shape representation of the property (boundary) and retrieve the coordinates that define its shape.	IfcShapeRepresentation
5. Carry out a geometric test to ensure that there is no overlap of the allowed area footprint with the property footprint.	
6. This can be achieved in various ways including testing the X, Y coordinates of the bounding box representations of the allowed area and the property within the local coordinate system of the property to ensure that: <ul style="list-style-type: none"> Xmin (property) <= Xmin (allowed area) Ymin (property) <= Ymin (allowed area) Xmax (property) >= Xmax (allowed area) Ymax (property) >= Ymax (allowed area) test that there are no intersections of the lines defining each footprint 	

Post Conditions

For defining the allowed area:

- The allowed area is specified by geometric representation item(s) that are identified as 'Allowed Area'
- A property within a relevant property set specifies the allowed purpose of a construction that can be placed within the allowed area.

For locating the allowed area:

- Returns a value of TRUE to indicate that the allowed area is contained within the property (boundary)
OR
- Returns a value of FALSE to indicate that the allowed area is not contained within the property (boundary)

IFC Usage and Extension Requirements

Existing Entity/Class Usage

Entity Class Name	Usage
IfcRelAggregates	Used to determine the containment relationship between a property and an allowed area.
IfcShapeRepresentation	Provides the footprint for the allowed area and the property
IfcSpace	Specifies the allowed area and the property/external space

New Property Set Requirement

Name:	Pset_AllowedArea
Applicability:	Subtype of IfcSpatialStructureElement entity

Applicable Classes:	
Applicable Type Value:	
IFC Version:	
Definition:	Specifies properties of an area of a site within which construction is allowed

Property	Type	Datatype	Unit	Definition
AllowedPurposes	IfcPropertyListValue	IfcLabel		Specifies a list of allowed purposes according to the classified naming of construction purposes or purpose groups mandated by the local regulatory authority. Note that a list is used for this property rather than a single value since an allowed area within property may be enabled for more than one type of construction.

Issue List

Question	Answer
Can an allowed area actually have more than one purpose specified? If not, then this property should be a single value and not a list.	
This can also apply to an area specified in zoning provisions.	YES
Should we create a new entity to deal with overlapping external areas, instead of using IfcSpace	PROBABLY
Does the allowed area have to wholly contain the projected area of the building including overhangs for the roof etc. or does it have to contain only the footprint of the building (in which case a roof may overhang the allowed area).?	Should include the projected area of the building including overhangs for the roof etc. (ref FM comment 15/04/2004)